Reduced Operation Alternative, NNSA proposes to only fabricate engineering demonstration units for half of the pits in the U.S. stockpile. Engineering demonstration units are used to recapture the technology needed to manufacture pits of various types and to develop and demonstrate pit fabrication processes. These changes would reduce specific environmental impacts such as transuranic waste generation and worker dose. However, this reduction in the number of engineering demonstration units would not meet the full stockpile stewardship mission (LLNL 2002bf).

A.2.5.4 *Reduce Pit Surveillance Efforts*

LLNL performs surveillance activities for all pits in the active and inactive U.S. stockpiles. Pit surveillance activities include determination of the important pit characteristics and destructive examination of the pits to assess suitability for safety and performance. Under the Reduced Operation Alternative, NNSA proposes to perform pit surveillance activities on LLNL-designed pits only, a reduction of 50 percent from the No Action Alternative. These changes would reduce specific environmental impacts such as transuranic waste generation and worker dose. The reduction in pit surveillance activities, however, would not meet the full stockpile stewardship mission (LLNL 2002bf).

A.2.5.5 *Reduce the Number of Subcritical Assemblies*

LLNL fabricates subcritical assemblies for the U.S. Stockpile Stewardship Program. Under the Reduced Operation Alternative, NNSA proposes to fabricate subcritical assemblies for the LLNL testing program only. This nearly 50-percent reduction in operations would reduce specific environmental impacts such as transuranic waste generation and worker dose. However, the reduction would not meet the full stockpile stewardship mission (LLNL 2002bf).

A.2.5.6 *Terascale Simulation Facility Operations Reduction*

Under the Reduced Operation Alternative, NNSA proposes to operate Terascale Simulation Facility at 60 percent capacity (e.g., 60 teraflops). These changes would reduce energy requirements for the facility from 25 megawatts to 15.3 megawatts, but would not meet the full stockpile stewardship mission. However, by maintaining the facility in full operational readiness in terms of hardware, software, and operations staff, the facility could be ramped back to full capacity in a very short time. Therefore, the Reduced Operation Alternative for the facility would include no reduction in staff.

A.3 SITE 300

Site 300 occupies approximately 7,000 acres, approximately 11 square miles, in Alameda and San Joaquin counties, approximately 15 miles southeast of the Livermore Site. Site 300 was established in 1955 as a remote explosives testing ground for the theoretical weapons developed at LLNL. Site 300 facilities offer approximately 381,000 gross square feet of operational space, with 4 percent in temporary facilities. The area surrounding Site 300 is sparsely settled and is used for sheep and cattle ranching, wind farming, and off-road vehicle recreation at the Carnegie State Vehicular Recreation Area. Fireworks America Corporation and SRI International maintain explosives test facilities in the area (LLNL 2002l). The Tracy Hills Development, a planned mix of residential, schools, offices, commercial, industrial, and public service was approved by Tracy

City Council in 1998. The development would be located northeast of and adjacent to the test site. Residential development was limited within the city of Tracy by the passage of Measure A, a slow-growth ordinance, in 2000. The residential development portion of the Tracy Hills Development cannot begin until 2007. There are no similar time constraints for the commercial/industrial portion of the development plan, although individual project permits would still require approval by the city of Tracy (Newcorn 2003).

Activities at Site 300 include (LLNL 2002l):

- Test firing of explosives that allows sophisticated diagnostic recovery of high explosives test data
- Dynamic and thermal testing of explosives
- Explosives formulation, processing, machining, radiography, and assembly
- Nonexplosives experimentation
- Testing of weapons components
- Explosives waste treatment
- State-of-the-art destructive and nondestructive materials and weapons design
- Diagnosis of the chemical reactions involved in explosives detonations
- Compatibility and reaction studies of explosives
- Storage of explosives
- Transportation of explosives

Site 300 includes two remote test areas (thermal and dynamic test areas); a chemistry area, process area, a pistol range area, and a general services area (Figure A.3–1 and Figure A.3–2).

A.3.1 Existing Infrastructure

Site 300 infrastructure includes telephones, lighting, other utilities, landscaping, drainage, parking, pathways, and roads. LLNL would continue to maintain, upgrade, and expand this infrastructure under the No Action Alternative, the Proposed Action, and the Reduced Operation Alternative as described in Chapter 3 of this LLNL SP/SWEIS. Figure A.3–1 shows the site map, which illustrates the major roadways. Utilities at Site 300 include domestic water, compressed air, sewage, and electric power. These utilities are described below.

Domestic water is supplied by onsite wells with a current capacity of 930,000 gallons per day. In 2002, the peak usage was approximately 67,900 gallons per day (LLNL 2003aq). A new water supply project has been completed that will supply Site 300 with water from the city of San Francisco's Hetch Hetchy water supply system. The new supply system has an estimated capacity of approximately 648,000 gallons per day with an expansion capacity of 1.2 million gallons per day.

Metered power is supplied by Pacific Gas & Electric Company's Tesla substation. In 2002, the instantaneous electrical load at Site 300 averaged 3.4 megawatts. Site 300 has the capacity to provide up to 20 megawatts (LLNL 2003aq).

Sanitary sewage is piped from the general services area to an oxidation and percolation pond system. In 2002, sewage was pumped at the rate of approximately 2,100 gallons per day. The system has a current capacity of 7,000 gallons per day. Sewage from other areas is disposed of in septic tanks, leachfields, or cesspools at each building (LLNL 2000a).

At the high explosive process area, compressed air is supplied at 125 pounds per square inch from a central air plant at Building 815. Individual air compressors supply the remainder of Site 300's compressed air needs (LLNL 2000a).

A.3.2 Existing Facilities

Facilities at Site 300 are shown in Figure A.3–1 and Figure A.3–2. The following descriptions are limited to facilities with potentially hazardous inventories. Facilities associated with waste management, security, health services, and emergency response are also briefly described.

The selected facilities at Site 300 are described in Sections A.3.2.1 through A.3.2.27 and are listed in Table A.3.2–1, with information on location, square footage, operations, and hazard assessment. Figure A.3.2–1 highlights the selected facilities. Hazards may be radiological, chemical, or other. Radiological hazards include low-level ionizing radiation, which could cause cancer, genetic defects, or noninheritable birth defects. Chemical hazards include chemicals that may be toxic, flammable, corrosive, poisonous, and/or carcinogenic. Other hazards include high explosives, non-ionizing radiation, biological agents, compressed gas cylinders, and electrical equipment. A brief summary discussion on generated wastes and effluents is included. For a more detailed discussion on waste generation and waste management, refer to Appendix B.

An overview of all facilities is included in Table A.3.2–2. Several facilities at Site 300 that were described in the 1992 LLNL EIS/EIR (LLNL 1992a) have been excessed. Excessed refers to a facility, materials, etc. that are no longer necessary to meet a program's mission and are being returned to LLNL's Director of Operations for future use.

TABLE A.3.2–1.—*Overview of Selected Facilities at Site 300*

Facility Number	Facility Name	Square Feet	Office	Laboratory/ Research	Service/ Support	Storage	Other	Hazard		
								Chemical	Radiological	Other[a]
801	Contained Firing Facility	51,000	Yes	Yes	Yes			Yes	Yes	Yes
804	Low-level Waste Staging Area	3,733				Yes			Yes	
805	HE Assembly/Machining	6,802	Yes		Yes			Yes		Yes
806	HE Machining	8,314	Yes		Yes	Yes		Yes		Yes
807	HE Machining	1,575			Yes			Yes		Yes
809	HE Pressing Facility	3,005	Yes		Yes	Yes		Yes	Yes	Yes
810	HE Assembly	5,079	Yes		Yes	Yes		Yes	Yes	Yes
812	Explosives Test Facility	5,532		Yes	Yes	Yes		Yes	Yes	Yes
816	Explosives Waste Storage Facility	1,200				Yes		Yes		
817	HE Pressing	2,739			Yes	Yes		Yes		Yes
819	Decontamination Facility	811			Yes	Yes		Yes		
821	Chemistry Storage	454				Yes		Yes		
822	Controlled Materials Storage Vault	296				Yes		Yes	Yes	
823	LINAC Radiography	2,748	Yes		Yes			Yes	Yes	Yes
825	Chem Process Facility (explosives research)	1,224		Yes				Yes	Yes	Yes
826	Chem Process Facility (explosives research)	1,742	Yes	Yes				Yes	Yes	Yes
827	Chemistry Process Facility	7,744	Yes	Yes	Yes	Yes		Yes	Yes	Yes
829	Energetic Materials Processing Center	40,000	Yes	Yes	Yes	Yes		Yes	Yes	Yes
832	Materials Management Shipping/Receiving Facility	10,970	Yes		Yes	Yes		Yes	Yes	Yes
834	Thermal Test Facility	8,267		Yes		Yes		Yes	Yes	
836	Dynamic Test Facility	13,288	Yes	Yes	Yes			Yes	Yes	
845	Explosives Waste Treatment Facility	666				Yes		Yes		Yes
850	Hydrodynamic Test Facility	5,840	Yes	Yes	Yes			Yes	Yes	Yes
851	Hydrodynamic Test Facility	13,681	Yes	Yes	Yes			Yes	Yes	Yes
854A, H, V	Site 300 Response Training Facility	6,142		Yes		Yes		Yes	Yes	Yes

TABLE A.3.2–1.—*Overview of Selected Facilities at Site 300 (continued)*

Facility Number	Facility Name	Square Feet	Office	Laboratory/ Research	Service/ Support	Storage	Other	Hazard		
								Chemical	Radiological	Other[a]
857	Materials Management Storage Facility	440						Yes		
882	PFD Communication Center	4,912	Yes		Yes					
883	EPD/RHWM Container Storage	1,733				Yes		Yes		
889	Health Services/Badging Facility	2,709	Yes		Yes					Yes
890	Fire Station	6,752	Yes		Yes					
NA	HE Rinsewater Surface Impoundment Ponds	42,000					Yes			Yes

Source: Original.

[a] Other hazards include high explosives, accelerators, x-ray machines, lasers, biological, the storage and handling of compressed gas cylinders, and electrical hazards.

CNG = Compressed Natural Gas; DPRF = Defense Program Research Facility; DWTF = Decontamination and Waste Treatment Facility; EPD = Environmental Protection Department; HC = Hydrocarbon; HEA = Health and Ecological Assessment; HE = high explosive; HETB = Hardened Engineering Test Building; HWM = hazardous waste management; ICF = Inertial Confinement Fusion; LINAC = LLNL Electron-Positron Accelerator; LTAB = Laser and Target Area Building; MeV = million electron volts; NIF = National Ignition Facility; PFD = Protective Force Division; RHWM = Radioactive and Hazardous Waste Management; TSDF = Treatment, Storage, Decontamination Facility; WMRDF = Weapons Materials Research and Development Facility; YMP = Yucca Mountain Project.

TABLE A.3.2–2.—*Overview of All Other Facilities at Site 300*

Facility Number	Facility Name	Square Feet	Office	Laboratory/ Research	Service/ Support	Storage	Other
802A	Camera Test Facility (optic lab – inactive)	2,934	Yes	Yes			
803	Wildlife Management Warehouse	1,484				Yes	
808	Vacant	1,440				Yes	
811	Storage	1,006				Yes	
813	Change House	2,822	Yes		Yes		
814	Vacant	2,150	Yes	Yes	Yes		
815	Central Air Plant	1,219				Yes	
820	Vacant	2,219			Yes	Yes	
828	HE Machining - inactive	683			Yes		
830	PE/Storage - electrical	1,735				Yes	
832F	Storage	2,995	Yes			Yes	
833	EPD/ERD Service-R&D	1,851	Yes	Yes		Yes	
835	EPD/ERD Storage	1,196				Yes	
837	DTED Storage	1,2426				Yes	
838	Vacant	601				Yes	
840	Vacant	777		Yes		Yes	
841	Pesticide Storage - C&M Shop	1,680				Yes	
842	Communication Hut	458			Yes		
843	EPD/ERD Storage/Yard	952			Yes	Yes	
844	Booster 1 (water)	374			Yes		
846	Central Power Substation	497			Yes		
847	Booster 2 (water)	292			Yes		
848	Weather Station	765		Yes		Yes	
853	Booster 3 (water)	292			Yes		
854B-G, J	Dynamic Test Complex	10,610		Yes	Yes	Yes	
855	Disassembly Facility (mothball)	1,934		Yes	Yes		
856	Industrial Storage	1,484				Yes	
858	Drop Tower Complex	2,420		Yes		Yes	
859	Storage	1,484				Yes	
860	Storage	313				Yes	
865	Advanced Test Accelerator	64,731				Yes	
866	Communications Hut	610			Yes		
867	Bunker Support Facility	4,342				Yes	
869	PE/Maintenance Shop Storage	358				Yes	
870	Project Management/ Chemistry/NNSA	3,890	Yes		Yes	Yes	
871	Administration	7,895	Yes				
872	PE Paint Shop	1,925	Yes		Yes		
873	PE Main Shops	17,447	Yes		Yes		
874	Mechanical Shops	19,231	Yes	Yes	Yes	Yes	
875	PE/Supply & Maintenance	14,903	Yes		Yes		
876	Gas Cylinder Storage	2,400				Yes	
877	Computer Technical Support	3,352	Yes		Yes		
878	PE/Maintenance Shop Storage	440				Yes	
879	Motor Pool & Garage	2,797	Yes		Yes		
880	Cafeteria	2,759				Yes	Yes

TABLE A.3.2–2.—*Overview of All Other Facilities at Site 300 (continued)*

Facility Number	Facility Name	Square Feet	Office	Laboratory/ Research	Service/ Support	Storage	Other
886	Well Storage Building	36				Yes	
887	Water Well	144			Yes		
888	Water Well	70			Yes		
890	Fire Station	6,752	Yes		Yes		
891	Main Gate Kiosk	50					Yes
892	Central Control Post	884	Yes		Yes		
894	Process Post/Vacant	143					Yes
895	EPD/ORAD Office	363	Yes				
896	East Observation Post	33					Yes
897	West Control Post	293					Yes
898	West Observation Post	411					Yes
899	Pistol Range	3,021	Yes		Yes		Yes
8340	EPD/ERD TF834 Monitoring	273		Yes			
8710	Administration	520	Yes				
8711	Training Facility	482					
8726	EPD/ERD Offices	1,000	Yes				
8801	PE Inspection	360	Yes				
8806	Video Conference/Training	536	Yes				Yes
8825	Security Fitness	370					Yes
8826	Shower Facility	943					Yes
8990	B 899 A&B Wash-up Facility	240					Yes
8991	Security Training Facility	546	Yes				
Storage Magazines							
1	Magazine - Storage Vault	386				Yes	
2	Magazine - EWSF	418				Yes	
3	Magazine - EWSF	137				Yes	
4	Magazine - EWSF	137				Yes	
5	EWSF magazine	140				Yes	
7	Magazine - Storage Vault	386				Yes	
8	Magazine - Storage Vault	386				Yes	
10	Magazine - Storage Vault	120				Yes	
21	Magazine - Storage Vault	425				Yes	
22	Magazine - Storage Vault	425				Yes	
23	Magazine - Storage Vault	427				Yes	
24	Magazine - Storage Vault	67				Yes	
30	Magazine - Storage Vault	386				Yes	
31	Magazine - Storage Vault	386				Yes	
32	Magazine - Storage Vault	386				Yes	
33	Magazine - Vault	139				Yes	
34	Magazine - HE Cubical	52				Yes	
35	Magazine - Storage Vault	386				Yes	
36	Magazine - Storage Vault	386				Yes	
37	Magazine - HE Cubical	52				Yes	
38	Magazine - Storage Vault	751				Yes	
41	Magazine - Storage Vault	751				Yes	

TABLE A.3.2–2.—*Overview of All Other Facilities at Site 300 (continued)*

Facility Number	Facility Name	Square Feet	Office	Laboratory/ Research	Service/ Support	Storage	Other
51	Magazine - Vault	138				Yes	
52	Magazine - Storage Vault	492				Yes	
58	Magazine	NA				Yes	
70	Magazine - Storage Vault	288				Yes	
71	Magazine - Storage Vault	138				Yes	
72	Magazine - Storage Vault	138				Yes	
80	Ready Vault	386				Yes	
80A	Magazine - Magazette	14				Yes	
80B	Magazine - Magazette	14				Yes	
82	Magazine - Storage	55				Yes	
83	Ready Vault	373				Yes	
83A	Magazine - Magazette	12				Yes	
83B	Magazine - Magazette	12				Yes	
816	EWSF Magazine	1,200				Yes	
817C	HE Storage	345				Yes	
818A	HE Storage Facility	1,244				Yes	
818C	HE Storage Facility	291				Yes	
824	HE Storage Facility	294				Yes	
834M	Thermal Test Facility	1,690				Yes	
854V	Storage	500				Yes	
855	Magazine (planned)					Yes	
858A	Storage	865				Yes	

Source: Original.

C&M = Construction & Management; DTED = Defense Technologies Engineering Division; EPD = Environmental Protection Department; ERD = Environmental Restoration Division; EWSF = explosives waste storage facility; HE = high explosive; NNSA = National Nuclear Security Administration; ORAD = Operations and Regulatory Affairs Division; PE = Plant Engineering; R&D = research and development.

A.3.2.1 *Building 801 Complex*

The Building 801 Complex comprises Buildings 801A, 801B, and 801D and is approximately 51,000 gross square feet. The Building 801 Complex is part of the explosives test facilities and is in the northeast quadrant of the site, called the east firing area (LLNL 2001ao).

An indoor firing chamber was added as part of the contained firing facility modifications made between 1998 and 2001. Performing test explosions in the firing chamber dramatically reduces particle emissions and minimizes the generation of hazardous waste, noise, and blast pressure (LLNL 2002cl). The modifications also included a new support facility, mechanical/electrical equipment area, and a diagnostics equipment facility in Building 801A. Additional office facilities were added to Building 801D (LLNL 2001ao).

The Building 801 Complex is designed to obtain explosives test data through the use of the flash x-ray accelerator, designed to accelerate charged particles and generate x-rays; a high-speed camera; and a laser-doppler interferometry operation. This equipment measures the velocity of explosively driven surfaces. Other electronic and mechanical systems capable of diagnosing various aspects of the high explosives tests are housed in Building 801 Complex facilities (LLNL 2001ao).

Hazards Assessment

The common hazards at this firing complex are associated with the handling and firing of explosives, high voltage electricity, toxic and radioactive materials, high levels of ionizing radiation, lasers, cranes and machine tools, and high-pressure systems. Personnel could be exposed to x-rays from the flash x-ray accelerator or non-ionizing radiation from high-power lasers. The high-speed rotor cameras, if allowed to revolve at too high a speed, will come apart, scattering parts of the beryllium rotor around the camera room.

The hazards in the photoprocessing operations are various laboratory reagents, photochemicals, and chemicals in spent developers, fixers, and rinsewaters. When film is processed, the developers and fixers are automatically replenished and waste is captured in separate barrels.

Formal operational safety procedures have been prepared for the facility as a whole. These are supplemented for individual tests. Procedures are reviewed by the Hazards Control Department. All explosives are handled, transported, and test fired following these procedures. All work with radioactive materials and toxic materials conforms to established health and safety guidelines.

In the explosive firing facilities, personnel safety is enhanced by positive key control of the various aspects of the operation, including enabling the firing console. Personnel are excluded from areas of x-ray flux by fences, barriers, and interlocked access doors and gates. The interferometer room is also interlocked. Equipment is electrically isolated from the shot assembly until personnel are under cover. A muster or positive accounting is used for control of personnel access to the test area.

Personnel are not allowed to enter the firing chamber after a shot until specific conditions are met, including waiting for a specified period of time in case of malfunction or misfire. Re-entry

into the firing chamber is performed after the chamber ventilation has purged hazardous atmospheres. Personnel use personal protective equipment that is appropriate to the exposure potential of the hazardous materials in the chamber (LLNL 2001ao).

Generated Wastes and Effluents

The containment chamber is equipped with a portable, manually operated water washdown system that uses an articulating nozzle. This system washes detonation residue that may contain radioactive materials, such as depleted uranium, or hazardous contaminants, such as beryllium, from the firing chamber walls and floor. A manually operated hose and a high-pressure washer are also used, when necessary, to complete the cleanup process. The washdown water from the chamber is diverted to a 20,000-gallon holding tank, filtered, and reused. However, if it becomes necessary to dispose of the washdown water stored in the holding tank, the water would be sampled and transferred to the Livermore Site for discharge to the sanitary sewer if parameters are within acceptable limits. If not, the water would be transferred to RHWM for appropriate disposal. Other wastewater, including photographic wastewater and water generated from a protective clothing washing process, would be handled in a similar manner that could include transferring the water to the Site 300 Class II surface impoundments (LLNL 2001ao).

Tritium has contaminated the firing chambers in the past and will be a contaminant in the future. The hazardous wastes generated from the photoprocessing operations, the flash x-ray, and the interferometry operations include solvents, lubricating fluids, dielectric fluids, and photographic wastes. These nonradioactive wastes are temporarily stored in the workplace waste accumulation area and transferred to RHWM for treatment and/or disposal (LLNL 2001ao).

A.3.2.2 *Building 804*

Building 804 is a 3,733-gross-square-foot facility in the northeast quadrant of Site 300. This facility is currently used exclusively as the staging area for low-level radioactive wastes generated in any of the Site 300 facilities before the wastes are shipped to a proper disposal site. A small bunker at this facility is currently not being used but may be used in the future (LLNL 2001ao).

Low-level radioactive wastes are generated at bunker firing tables where test assemblies are detonated. The waste debris consists of gravel, wood, steel, aluminum, concrete, plastic, glass, burlap bags, cables, and other inert testing materials. RHWM prepares the containerized gravel at Building 804 for offsite disposal (LLNL 2001ao).

Other specific waste streams handled at Building 804 include empty containers, contaminated paper and rags, protective clothing, glassware, plasticware, tubing and fittings, wood and metal parts, HEPA filters contaminated with radioactive constituents, nonhazardous residues, metals, and contaminated equipment.

Hazard Assessment

Wastes stored at this facility consist primarily of low-level radioactive wastes. The low-level radioactive wastes consist of depleted uranium and, on rare occasions, small amounts of thorium. Mixed wastes also contain metal components (LLNL 2001ao).

Proper segregation and control of the packaging and handling operations are essential for the safety of personnel and protection of equipment. Operational safety features include characterizing firing table waste to segregate low-level radioactive waste from mixed waste; specifying containers for shipment and disposal or reprocessing of low-level radioactive wastes at an offsite location; following procedures for sampling and analysis, containerization, staging, and certification of wastes; fulfilling record keeping requirements; and conducting radiation measurements. The external radiation measurements for shipping or disposal containers are included on the computerized record keeping system and are also noted on each container (LLNL 2001ao).

Generated Wastes and Effluents

This facility is used primarily as a staging area for low-level radioactive wastes before reconditioning or shipment to an offsite disposal location. No wastes are generated at Building 804 (LLNL 2001ao).

A.3.2.3 *Building 805*

Building 805 is a 6,802-square-foot facility in the southeast quadrant of Site 300, known as the process area. Building 805 is used for machining metal and nonmetal parts; i.e., stainless steel, brass, plastic, etc., and mock explosives. The packaging or repackaging of explosives waste is also performed at this facility prior to storage at the Explosives Waste Storage Facility (EWSF) or shipment to the Explosives Waste Treatment Facility (EWTF) for treatment (LLNL 2002ap).

Hazards Assessment

The major hazard associated with packaging and repackaging waste explosives is the possibility of detonation of the explosives by mishandling. The hazards associated with the machining process involve rotating equipment and toxic chemicals in the explosives waste and mock explosives (LLNL 2002ap).

Generated Wastes and Effluents

Wastes generated during the machining of mock explosives consist of dust. The nonhazardous dust is collected in a air district permitted dust collector and disposed of in the general trash (LLNL 2002ap).

A.3.2.4 *Building 806 Complex*

The Building 806 Complex is located in the process area in the southeast quadrant of Site 300 and consists of Buildings 806A and 806B. This 8,314-gross-square foot complex is used for machining and inspecting explosive parts. Explosives are also temporarily stored at the complex (LLNL 2002ap).

Hazards Assessment

The major hazard associated with this complex is the detonation of explosives during the machining process. Risks also include those associated with the operation of the machinery and

chemicals used in the machining process. Machining is performed both with an operator present and remotely from a control room. During remote operations, all operations personnel are alerted, fences are secured with warning lights and alarm systems, and the limited personnel present are restricted to the control room (LLNL 2002ap).

Generated Wastes and Effluents

Wastes contaminated with high explosives are generated in the Building 806 Complex. The water used during the machining process is passed through two filter bags, and the trapped explosives waste is placed in plastic-lined containers for storage and treatment at the EWTF. The filtered water passes through a conical clarifier, settling basin, and weir and then drains to surface impoundments south of the complex. Scrap explosive pieces are wrapped, boxed, and labeled for treatment at the EWTF and storage at the EWSF (LLNL 2002ap).

A.3.2.5 *Building 807*

Building 807 is located in the process area in the southeast quadrant of Site 300 and is used for activities similar to those of the Building 806 Complex. This 1,575-gross-square-foot facility is used to machine and inspect explosives parts and to decontaminate potentially contaminated equipment. Explosives parts are also temporarily stored at the complex (LLNL 2002ap).

Hazards Assessment

The major hazard associated with this building is the detonation of the explosives during the machining process. Risks also include those from the rotation of the machinery and chemicals used in the machining process. Machining is performed both with an operator present and remotely from a control room. During remote operations, all operations personnel are alerted, fences are secured with warning lights and alarm systems, and the limited personnel present are restricted to the control room (LLNL 2002ap).

Generated Wastes and Effluents

Wastes contaminated with high explosives are generated in Building 807. The water used during the machining process is passed through two filter bags, and the trapped explosives waste is placed in plastic-lined containers for storage and treatment at the EWTF. The filtered water passes through a conical clarifier, settling basin, and weir and then drains to surface impoundments south of the complex. Scrap explosive pieces are wrapped, boxed, and labeled for treatment at EWTF and storage at the EWSF (LLNL 2002ap).

A.3.2.6 *Building 809 Complex*

The Building 809 Complex is located in the process area in the southeast portion of Site 300. This 3,005-gross-square-foot complex consists of Buildings 809A, 809B, and 809C. Building 809A is currently being modified to install an isostatic press for pressing explosives powders into parts. Building 809B is under construction as a utilities service building. Building 809C is under construction and will house ovens for preheating explosives powders prior to pressing. A new magazine has also been constructed at this complex (LLNL 2002ap).

Hazards Assessment

The major hazard associated with machining explosives is the possibility of ignition from the forces involved. There are also hazards associated with high temperatures and pressures and the toxic nature of the chemicals in the explosives that present the risk of injury to personnel. Rotating equipment also presents the risk of injury to personnel. Heating and pressing of explosives are conducted remotely, under controlled temperature conditions (LLNL 2002ap).

Operational safety plans are enforced in the Building 809 Complex to ensure personnel safety. During remote operations, all personnel and the process security post operator are alerted, the gate to the area is locked warning lights and alarm systems are activated and the limited personnel present are restricted to the control room (LLNL 2002ap).

Generated Wastes and Effluents

Currently, there are no explosives-contaminated wastes generated at this building complex, but in the future, there will be wastes that will be handled following the process described for Building 817 (LLNL 2002ap).

A.3.2.7 *Building 810 Complex*

The 5,079-gross-square-foot Building 810 Complex is located in the process area, in the southeast quadrant of Site 300, and consists of Buildings 810A, 810B, and 810C. Building 810A and 810B are used to assemble explosives parts into test components. Building 810A is also used for the temporary storage of explosives parts. Building 810C is used for storing nonexplosive parts for test components. The test components may also include beryllium, lithium, tritium, thorium, or depleted uranium (LLNL 2002ap).

Hazards Assessment

The major hazard associated with this complex is the detonation of the explosives by dropping or mishandling. The number of personnel is limited in these buildings (LLNL 2002ap).

Generated Wastes and Effluents

High explosives-contaminated wastes are generated at this complex. Explosives waste is placed in plastic-lined containers for treatment at the EWTF and storage at the EWSF (LLNL 2002ap).

A.3.2.8 *Building 812 Complex*

The Building 812 Complex is an active open-air explosives firing facility. The complex includes five buildings (Buildings 812A, 812B, and 812C, 812D [currently inactive], and 812E), two magazines, and an open-air firing table. Building 812E is currently used to repair and test portable x-ray equipment. The current complex total operational building area is 5,532 gross square feet (LLNL 2001ao).

Hazards Assessment

The common hazards associated with the Building 812 firing facility are handling and firing explosives, high-voltage electrical equipment, toxic and radioactive materials, high levels of ionizing radiation, operational and maintenance equipment, and high-pressure systems. There may be exposure to ionizing radiation from portable radiation generating devices (LLNL 2001ao).

The hazards in the photoprocessing operations are various laboratory reagents, photochemicals, and chemicals in spent developers, fixers, and rinsewaters. When film is processed, the developers and fixers are automatically replenished and the generated waste is captured in separate barrels (LLNL 2001ao).

Formal operational safety procedures have been prepared for the facility and these are supplemented for the peculiarities of individual tests and reviewed by the Hazards Control Department. All explosives are handled, transported, and test fired only while strictly following these procedures. All work with radioactive toxic materials conforms to established health and safety guidelines. Additional restrictions are imposed during the grass fire season (LLNL 2001ao).

Personnel safety is enhanced by positive key control in the explosive firing facilities. Personnel are excluded from areas of x-ray flux by fences, barriers, and/or interlocked access doors and gates. Equipment is electrically isolated from the shot assembly until personnel are under cover. A muster is used for positive control of personnel access to the test area (LLNL 2001ao).

Personnel are not allowed to enter the firing table area after a shot until specific conditions are met, including waiting for a specified period of time in case of malfunction or misfire. Appropriate personal protective equipment is used to re-enter the firing table after experiments involving hazardous materials. Water may be used to put out fires on the table and minimize dust production.

Generated Wastes and Effluents

Debris may consist of gravel, wood, steel, aluminum, concrete, plastic, glass, burlap bags, cables, and other inert testing materials. These wastes may be contaminated with depleted uranium or thorium. Small amounts of metals; e.g., lead, beryllium, copper, barium, vanadium, etc., may also be present (LLNL 2001ao). In the past, tritium was a contaminant at this facility, but tritium experiments will be discontinued at this facility in the future (LLNL 2003i). The detonation debris is characterized to segregate the low-level radioactive waste from hazardous waste. The low-level radioactive waste is placed in containers for recycling or transported to the Building 804 waste staging area. All hazardous wastes are transported to Building 883 for storage prior to transfer to Livermore Site or shipment offsite for disposal (LLNL 2001ao).

The hazardous wastes generated from the photoprocessing operations and the portable x-ray operations include solvents, lubricating fluids, dielectric fluids, and photographic wastes. These nonradioactive wastes are temporarily stored in the workplace waste accumulation area until transferred by RHWM for treatment or offsite disposal (LLNL 2001ao).

A.3.2.9 *Building 817 Complex*

The High Explosives Pressing and Oven Complex, the Building 817 Complex, is located in the southeast quadrant of Site 300. This 2,739-square-foot complex comprises Buildings 817A through 817H and includes laboratories, mechanical equipment areas, a control room, and storage space for the preparation and isostatic pressing of bulk explosives and mock high explosives (LLNL 2002ap).

Building 817A is a control room, Building 817B is the high explosives pressing facility, Building 817C is a temporary storage magazine, and Buildings 817D and 817E are currently inactive, but may become active if needed. Building 817F is the oven facility used for heating and annealing explosives. The oven facility contains two ovens, a scrub water tank and pump unit, an insulated transport cart, and handling trays. Building 817G is the boiler room facility and Building 817H is used for storage of inert parts, pressing bags, and general chemicals (LLNL 2002ap).

Hazards Assessment

The major hazard at this complex is an inadvertent explosion as the result of the handling, heating, and pressing of explosives. There is also the risk of injury to personnel associated with high temperatures and pressures or the toxic chemicals in the explosives. Heating and pressing of explosives are conducted remotely, under controlled temperature conditions. During remote operations, all personnel are alerted, the fenced area is locked, and warning lights and alarm systems are activated. Operating personnel are limited in number and restricted to the control room during remote operations. Explosives are permitted only in approved and posted areas, and an insulated cart is used to transfer hot material from the oven and from pressing operations. The work areas are frequently washed, and equipment, tools, fixtures, and other parts that may have become contaminated are decontaminated. Safety protocol and procedural documentation are used to ensure personnel safety (LLNL 2002ap).

Generated Wastes and Effluents

Wastes contaminated with high explosives are generated in this complex. Water is used in the cleanup process. The high explosives wastewaters are passed through two filter bags, and the trapped explosives waste are placed in plastic-lined containers for treatment at the EWTF and storage at the EWSF. The filtered water passes through a conical clarifier, settling basin, and weir and then drains into a retention tank that pumps automatically to the surface impoundment south of the complex. The scrap explosive pieces are wrapped, boxed, and labeled for treatment at the EWTF and storage at the EWSF (LLNL 2002ap). Other wastes include explosive-contaminated debris such as paper, protective clothing, and laboratory equipment and cleaning solutions.

A.3.2.10 *Building 819*

The Decontamination Facility, Building 819, is located in the southeast quadrant of Site 300. This 811-square-foot facility is used for pesticide mixing and storage, construction material storage, and equipment (vacuum pump) repair. Pesticides are mixed in a small room measuring 6 feet square. Pesticide containers are steam cleaned beneath a canopy adjacent to the facility.

Rinsewaters are collected and stored in tanks prior to treatment and/or disposal by RHWM (LLNL 2002co).

Hazards Assessment

The pesticide chemicals are toxic and care must be taken to prevent uptake by personnel. Operational safety procedures provide that the Hazards Control Department surveys the work area regularly to detect unsafe conditions, personnel wear pesticide cartridge respirators and natural rubber gloves when working with pesticides and take a shower after the work is completed, personnel wear organic vapor respirators and rubber gloves when working with solvents, the pesticides are stored in locked areas, and empty pesticide containers are disposed of properly (LLNL 2002co).

Generated Wastes and Effluents

The rinsewaters from cleaning pesticide containers are stored in tanks and cannot be discharged into the Building 819 drainage system. The tanks are handled by RHWM for proper treatment and disposal. The empty pesticide containers are rinsed thoroughly and inspected by the San Joaquin County Agricultural Commission before disposal at a local municipal landfill. The wastewater generated from the steam-cleaning operations is stored in a retention tank. When the tank is full, its contents are sampled and analyzed. Wastewater is then transferred by RHWM for treatment or disposal (LLNL 2002co).

A.3.2.11 *Building 821*

Building 821 is a 454-square-foot building in the southeast quadrant of Site 300 where flammable liquids are stored for use in the chemistry area (LLNL 2002ap).

Hazards Assessment

The major hazards are exposure to toxic effects of flammable material through inhalation of vapors and absorption by skin contact or ingestion (LLNL 2002ap).

Generated Wastes and Effluents

No waste is generated at Building 821 (LLNL 2002ap).

A.3.2.12 *Building 822*

The Building 822 storage facility is in the southeast quadrant of Site 300. This 296-square-foot building consists of four storage cells (A, B, C, and D) that are used to store nonexplosive controlled materials such as radioactive materials (solid depleted uranium, solid thorium, and tritium), deuterium, lithium hydride, sealed sources (Class 1 and 2 only), mock explosives, and solid beryllium. Explosives and other hazardous materials are not permitted in the building (LLNL 2000u).

Hazards Assessment

Safety features within this building include alarms and warning signs. The cell doors are secured by combination locks and have alarms. Access to the cells is limited to authorized personnel. Even though there are no adverse exposure consequences to onsite workers from normal operations, site personnel may receive exposures from radioactive materials, including sealed sources and depleted uranium, due to container ruptures during transfer operations. Materials are packaged to meet DOT requirements for transportation and would offer no adverse exposure risks unless the containers are breeched (LLNL 2002l, LLNL 2000u).

Generated Wastes and Effluents

This facility is used primarily for the storage of controlled materials; therefore, no wastes are generated (LLNL 2002l).

A.3.2.13 *Building 823 Complex*

The 2,748-square-foot LINAC Radiography Complex, Building 823, is in the southeast quadrant of Site 300 and consists of two buildings. Building 823A contains office space, a darkroom with a radiographic film processor, and control panels for three real-time imaging systems housed in Building 823B. These units include a transportable 9-million-electron-volt, a 2-million-electron-volt, and 120-thousand-electron-volt x-ray machines. Building 823B contains staging and real-time imaging systems, and a doubly encapsulated cobalt-63 isotope source in a lead-shielded radiographic projector. The isotope source is no longer operational and is being stored in Building 823 in a transportainer until it is sent back to the manufacturer for disposal. This complex provides the means for radiographic inspection of pressed explosives parts and weapon test components. After x-ray film has been exposed in Building 823B, it is processed through the automatic film processor in Building 823A. The authorized materials in this facility include explosives, natural and depleted uranium, and beryllium in metallic form. Fissile materials currently are not allowed at Site 300 but may be allowed only after thorough review and approval by Site 300 management and after proper operational safety procedures are applied (LLNL 2002ap).

Building 823B has an earth berm on two sides that provides radiation shielding for the office/control building located east of the berm. The Varian 9-million-electron-volt LINAC is used in Building 823B to beam into the open space directly to the west (LLNL 2002ap).

Hazards Assessment

The potential hazards in the Building 823 Complex arise primarily from the intense levels of radiation associated with the generated x-ray beam, the high voltages associated with the power supplies, and the handling of test units containing explosives, radioactive, or toxic materials. Explosives in powder form are not permitted at this facility, and explosives are not permitted at the facility when fissile materials are present. The number of personnel is limited to five when explosives are present. Protection from inadvertent exposure to x-radiation is provided by physical barriers, warning lights and chimes, safety interlocks, signs, and remote area monitoring. Before starting an x-ray operation, all personnel evacuate the fenced enclosures. A remote area monitor in the complex, which indicates radiation levels on a local readout meter

and on a duplicate meter in the control room, activates the warning lights and chimes when radiation levels become high. Flashing magenta lights and pulsed chimes indicate an x-ray exposure is in progress. No one is allowed to enter the area at that time. The operating area is enclosed by a safety fence and all gates are locked during operation of the machine (LLNL 2002ap).

Generated Wastes and Effluents

The wastes generated from this facility include photochemicals, spent fixers and developer, and photochemical rinsewaters. The photochemical rinsewaters are stored in retention tanks and pumped to the surface impoundment. The spent fixers and developers are handled by the materials management group and taken to the Livermore Site for silver recovery (LLNL 2002ap).

A.3.2.14 *Buildings 825, 826, and Building 827 Complex*

The Chemistry Area Complex comprises Buildings 825 and 826 and the Building 827 Complex and is used for processing, developing, and testing explosives. Buildings 825 and 826 are in the southeast quadrant of Site 300 and have areas of 1,224 square feet and 1,742 square feet, respectively. The Building 827 Complex, consisting of Buildings 827A, B, C, D, and E, with office, laboratory, and storage areas, is located in the south-central section of Site 300 and has a total area of 7,744 square feet (LLNL 2002ap).

Building 825 houses mechanical presses for pressing explosives and a Monel detonation sphere. A vacuum gas sampling system associated with the Monel detonation sphere, which measures detonation products, is currently nonoperational (LLNL 2002ap).

Building 826 houses a vertical temperature-controlled mixer for mixing explosives; binders, plasticizers, and other compounds; and a 2-ton mill for mixing extrudable (paste) explosives. A 50-cubic-inch deaerator loader is used for processing the extrudable explosives (LLNL 2002ap).

The Building 827 Complex consists of Buildings 827A, B, C, D, and E. Building 827A contains offices, a control room and a small-scale explosives cell. Building 827B contains a machine shop and inert storage area. Buildings 827C, D, and E are identical buildings each containing two explosives operating cells, an equipment room, an inert storage area, and a temporary explosives storage vault. The complex also contains three steam ovens for drying materials, small ball mills for reducing particle size, a 50-pound deaerator loader for processing extrudable explosives, blenders, slurry kettles for preparing explosives, and slurry-coating equipment. Equipment includes an environmental chamber and associated control and interlock modules, electrical resistance measurement devices, a gas sampling oven, a laser particle-size analyzer, and a computer system (LLNL 2002ap).

Hazards Assessment

Hazards associated with these facilities include the detonation of explosives powder during the pressing process and exposure to the toxics effects through the inhalation of dusts or vapors and absorption by skin contact or ingestion. Pressing explosives is conducted remotely. During remote operations, all personnel are alerted. Hazards also are associated with handling

explosives, propellants, pyrotechnics, and oxidizers and burning or detonating materials through impact, frictional heat, shock, electrical arcs, or sparks from static electricity. Hazards also include those associated with a small, enclosed laser. Mixing and loading of the explosives is conducted actively and remotely depending upon the requirements. The fenced area around the building is locked and warning lights and alarm systems are activated. Operating personnel are restricted to Buildings 827A or 827B. Safety documentation, including operational safety plans and the facility safety plans, is used to help ensure personnel safety (LLNL 2002ap).

Generated Wastes and Effluents

Wastes contaminated with high explosives are generated from activities performed in this complex. The explosives-contaminated trash is placed in plastic-lined containers for treatment at the EWTF and storage at the EWSF. Typical wastes include alkaline and acid solutions such as lab-packed solutions; lab-packed waste chemicals; nonhalogenated organic solutions; empty containers; debris such as contaminated paper and rags, protective clothing, glassware, plasticware, tubing and fittings, wood and metal parts, and HEPA filters contaminated with explosives and other hazardous constituents; wastewater; residues; metals; flammable liquids; cleaning solutions, including solvents; waste oil with trace gasoline, diesel, organics, and metals; and contaminated equipment.

Water used in the cleanup is passed through two bag filters that trap the explosives waste. The waste is placed in plastic-lined containers for treatment at EWTF and storage at the EWSF. The filtered water is collected in a retention tank where it is sampled prior to being trucked to the permitted surface impoundment or offsite (LLNL 2002ap).

A.3.2.15 *Building 816, Explosive Waste Storage Facility*

The EWSF is in the process area in the southeast quadrant of Site 300. The EWSF consists of a main structure (Building 816) and four earth-covered waste storage magazines and comprises approximately 1,200 square feet. The EWSF is permitted under a hazardous permit issued by the California Department of Toxic Substances Control for 1-year storage of explosives waste. Storage of other hazardous, radioactive, or mixed waste materials is prohibited (LLNL 2002ap).

Hazards Assessment

The major hazard associated with storing waste explosives is the possibility of detonation of the explosives through mishandling (LLNL 2002ap).

Generated Wastes and Effluents

The facility is used as a storage facility. No wastes are generated by this facility (LLNL 2002ap).

A.3.2.16 *Building 845, Explosive Waste Treatment Facility*

The EWTF is a 666-square-foot facility located in the north-central section of Site 300. The EWTF replaces Building 829, which has been closed. The EWTF consists of an earth-covered control room, Building 845A; an inert storage area, Building 845B; a thermal treatment unit (burn cage), an open burn unit (burn pad), and an open detonation unit (detonation pad). The EWTF is permitted under a hazardous waste permit issued by the California Department of Toxic Substance Control for the treatment of explosives waste. Treatment of other hazardous, radioactive, or mixed waste materials is prohibited (LLNL 2002ap).

Hazards Assessment

The main hazard associated with treating waste explosives is the possibility of detonation by mishandling. Personnel are limited in number and operations are conducted remotely. During operations, personnel are restricted to the control room, fencing is secured, and warning lights and alarm system are activated appropriately (LLNL 2002ap).

Generated Wastes and Effluents

Ash resulting from the burning of explosives waste in the thermal treatment cage and open burn unit is collected, weighed, and stored in an approved storage area within the facility. The ash is hazardous and is shipped offsite for proper disposal (LLNL 2002ap).

A.3.2.17 *Building 832 Complex*

The Building 832 Complex is in the southeast quadrant of Site 300 and consists of five buildings labeled 832A through 832E, two magazettes labeled M-832-1 and M-832-2, and the explosives vehicle inspection station, for a total gross area of 10,970 square feet. The Building 832 Complex is the central explosives materials shipping and receiving facility for LLNL, and the facility for shipping and receiving other controlled materials at Site 300 (LLNL 2000u).

Buildings 832A through 832C are storage facilities. Inert nonhazardous materials are stored in Buildings 832A and 832C. Building 832B is limited to the interim storage of explosives and explosives assemblies that may contain other controlled materials; i.e., depleted uranium, thorium, tritium, beryllium, lithium, deuterium, and mock explosives. Long-term storage is not allowed in Building 832B (LLNL 2000u).

Building 832D is limited to shipping and receiving of explosives and explosives assemblies that may contain other controlled materials, and sealed sources. Interim storage is permitted in Building 832D to complete shipping and receiving operations (LLNL 2000u).

Building 832E is limited to shipping and receiving of nonexplosive controlled materials, classified parts, sealed sources, and liquid nitrogen. Explosives and other hazardous materials are not permitted in the building. Interim storage is permitted in Building 832E to complete shipping and receiving operations (LLNL 2000u).

The explosives vehicle inspection station is used to inspect incoming commercial explosives transport vehicles prior to entering the Building 832 Complex. Explosives loading, unloading, and transloading are permitted at the explosives vehicle inspection station (LLNL 2000u).

Hazards Assessment

The primary hazards associated with the Building 832 Complex include exposure to explosives; toxic, reactive, pyrophoric, and carcinogenic materials; and ionizing and non-ionizing radiation. Activities within this complex are controlled by facility and operation safety plans. All work with radioactive or toxic materials conforms to established health and safety guidelines. Safety features include alarms and warning signs. The cell doors are secured by combination locks and are alarmed. Access to these facilities is limited to authorized personnel (LLNL 2000u).

Generated Wastes and Effluents

This complex is used primarily for shipping and receiving explosives and other controlled materials. No hazardous wastes or effluents are generated during normal facility operations. The quantity of waste generated is less than one cubic meter per year (LLNL 2000u).

A.3.2.18 *Building 834 Complex*

The Thermal Test Complex, Building 834, is in the southeast quadrant of Site 300 and consists of 12 buildings labeled 834A through 834H and 834J through 834M. The total gross area of these buildings is 8,267 square feet. This complex is used primarily for the thermal testing (cycling, shocking, and soaking) of specimens that may contain explosives or toxic materials and mock high explosives (LLNL 2002j). The use of a portable 9-million electron volts LINAC has been approved for occasional use at this facility.

The complex consists of four test buildings (834E, G, H, and J) three mechanical equipment buildings (834B, C, and D) three storage buildings (834F, K, and L) a storage magazine (834M) and a control building (834A). The test buildings, also known as test cells, are behind large earth berms. The control building and the mechanical equipment buildings are designed to withstand accidental detonation of explosives in the test cells (LLNL 2002j).

The principal operation here is the thermal testing of specimens that may contain explosives, radioactive, and/or toxic materials. During testing, a component is exposed to a given temperature for a specified time. The component may be cycled between cold and hot temperatures for hours or days and may be thermally shocked by introducing hot or cold air over the specimen (LLNL 2002j).

Hazards Assessment

A variety of materials and equipment are tested in this complex. Authorized materials used include high explosives, mock explosives, depleted uranium, thorium, lithium, and beryllium in metallic form (LLNL 2002j).

All operations in the Building 834 Complex are controlled by the facility safety plan (LLNL 2002bt). The plan ensures that explosives and explosives-contaminated materials are permitted only in test cells. No drilling, machining, sawing, or sanding of explosives and no operation requiring blending or mixing of explosives with other materials such as plastics, binders, adhesives, or metal dusts is permitted. Hazards also include those associated with the occasional use of a portable LINAC unit. Safety features in this complex include alarms and warning signs. The cell doors are secured by combination locks and have alarms. Access to these facilities is limited to authorized personnel (LLNL 2002j).

Generated Wastes and Effluents

This complex is used primarily as a test facility, and there are no hazardous wastes generated. Occasionally, scrap and solid waste are left after testing is completed. The quantity of solid waste generated is less than 1 cubic meter per year (LLNL 2002bt).

A.3.2.19 *Building 836 Complex*

The Dynamic Test Complex, Building 836, is in the southeast quadrant and consists of four buildings, 836A through 836D, with a total area of 13,288 square feet. The complex is used for the dynamic (vibration shock) testing of specimens containing explosives, radioactive materials, and/or toxic materials. An electrodynamic shaker can be programmed by computer to perform sine and random vibration and transient pulses. These tests can be performed at various temperatures in a thermal chamber. A portable 9-million-electron-volt LINAC is approved for occasional use at this complex (LLNL 2002bu).

The Dynamic Test Complex consists of a reinforced concrete control building (836A); a steel mechanical equipment and storage building (836B); an earth-covered, reinforced-concrete test cell (836C); and a reinforced-concrete electrodynamic shaker building (836D) (LLNL 2002bu).

Each test cell houses a large reaction mass needed as a counterweight and its associated hardware. This equipment is used in the testing and evaluation of various weapons systems and mechanical equipment subjected to vibration and shock environments. The complex has also been used for shock and vibration testing of rocket motors, seismic qualification of turbine-generator sets, and performance analysis of the rock bolts used in mine-tunnel construction (LLNL 2002bu).

Hazards Assessment

A variety of materials and equipment are tested in this complex. A portable 9-million-electron-volt LINAC is approved for occasional use at this complex. Authorized materials include explosives, mock high explosives, metallic beryllium, depleted uranium, thorium, and lithium hydride (LLNL 2002bu). In the thermal and dynamic tests, there is a possibility of putting sufficient energy into the test to detonate the explosives (LLNL 2002bu).

Personnel and operational safety controls are in effect. Tests with a moderate to high risk of reaction are done remotely. Remote procedures are required for tests involving mechanical shock or extrusion to the explosives and when the temperature of the explosives is above 170 degrees

Fahrenheit (^{o}F). These remote operations are controlled from a central control room protected from blast and fragments. During dynamic testing, musters limit the areas that personnel can enter. Continuous air monitoring is used during the test operation (LLNL 2002bu).

Fissile material and explosives are not permitted within a test assembly or within a facility at the same time. Explosives or explosive-contaminated material is permitted only in test cells. No operation is permitted that intentionally generates explosives dust or powder or that requires blending or mixing of explosives with other materials such as plastic, binders, glues, adhesives, or metal dust (LLNL 2002bu).

When a test cell has been flushed with nitrogen during a thermal conditioning test, the air within the facility is monitored prior to allowing personnel to re-enter the facility (LLNL 2002bu).

Generated Wastes and Effluents

This complex is used primarily for dynamic testing of equipment containing hazardous and toxic materials. Typical wastes would include alkaline and acid solutions; lab-packed waste chemicals; nonhalogenated organic solutions; empty containers; debris such as contaminated paper and rags, protective clothing, glassware, plasticware, tubing and fittings, and wood and metal parts; wastewater; residues; metals; cleaning solutions, including solvents; waste oil with trace gasoline, diesel, organics, and metals;, and contaminated equipment. Occasionally, scrap and solid waste is left over when testing is completed. The quantity of this solid waste is less than 1 cubic meter per year (LLNL 2002bu).

A.3.2.20 *Building 850 Complex*

The Hydrodynamics Test Facility, Building 850 Complex, is an explosives test facility. This 5,840-gross-square-foot complex consists of Bunker 850 and a magazette in the northwest quadrant of the site (called the west firing area) and comprises an active firing, explosives test, and high-speed camera repair and test facility. The multidiagnostic facility includes a permanently mounted, smooth-bore, 155-millimeter gun for conducting impact experiments, high-speed rotating-mirror cameras, gigalumen light sources, portable flash x-ray sources, and various other diagnostic equipment (LLNL 2001ao).

This facility has an outdoor detonation firing table with gravel covered pads for stands of concrete, wood, or steel. During an experiment, the explosive is placed on the test stand and fired. The firing debris may consist of wood, plastic, wiring, and gravel. This debris is potentially contaminated with high explosives, beryllium, and depleted uranium (LLNL 2001ao).

Hazards Assessment

The common hazards associated with the firing facilities are those associated with the handling and firing of explosives, high-voltage equipment, toxic and radioactive materials, cranes and machine tools, high-pressure systems, and high levels of ionizing radiation. Potential hazards include firing malfunctions, misfires, and grass fires (LLNL 2001ao).

The hazard associated with the high-speed photographic equipment is use of high-speed rotors. Some camera rotors are made of beryllium; if these rotors are allowed to revolve at too high a

speed, they will come apart, causing damage and scattering parts of the beryllium rotor around the camera room (LLNL 2001ao).

HEPA filtration systems in the intake of the open-air bunker ventilation system mitigate any hazardous material released into the facility environment. The risk of an inadvertent firing of a propellant-driven gun or an improper projectile trajectory is low due to design and administrative controls. Formal operational safety procedures have been prepared for the facility as a whole; these are supplemented for the unique requirements of individual tests and are reviewed by the Hazards Control Department. All explosives are handled, transported, and test fired following these procedures. All work with radioactive and toxic materials conforms to established health and safety guidelines. Additional restrictions are imposed during the grass fire season (LLNL 2001ao).

Personnel safety is enhanced by positive key control of the various phases and aspects of the operation, including the enabling of the firing console. Personnel are excluded from areas of x-ray flux by fences, barriers, and interlocked access doors and gates. Equipment is electrically isolated from the shot assembly until personnel are under cover. A muster is used for positive control of personnel access to the test area (LLNL 2001ao).

Following the shot, personnel are not allowed to enter the firing table area until specific conditions are met, including waiting for prespecified periods of time in case of malfunction or misfire. Appropriate personal protective equipment is used to re-enter the firing table after experiments involving hazardous materials. Water may be used to put out fires on the table and minimize dust production. Finally, table gravel is changed if the beryllium and radioactivity levels are above the derived working limits: 500 micrograms per gram for beryllium, 5,000 picocuries per gram for alpha emitters, and 10,000 picocuries per gram for beta or gamma radiation (LLNL 2001ao).

Generated Wastes and Effluents

The firing table debris consists of gravel and fragments of wood, metal, and glass; larger debris consists of tent poles, wood, steel, aluminum, concrete, plastic, glass, burlap bags, cables, and other inert testing materials. These wastes may be contaminated with low levels of depleted uranium and thorium. Small amounts of lead, beryllium, copper, barium, and vanadium may also be present (LLNL 2001ao). In the past, tritium was a contaminant at this facility, but tritium experiments will be discontinued at this facility in the future (LLNL 2003i). Typical wastes would include alkaline and acid solutions, including lab-packed solutions; lab-packed waste chemicals; nonhalogenated organic solutions; empty containers; debris such as contaminated paper and rags, protective clothing, and other test debris contaminated with explosives and other hazardous constituents; wastewater; cleaning solutions, including solvents; and contaminated equipment (LLNL 2001ao).

The firing table debris is characterized to segregate the low-level radioactive waste from chemically hazardous waste. The former is placed in containers and transported to the Building 804 waste staging area. All hazardous wastes (nonexplosive-contaminated) are transported to Building 883 for storage prior to shipment to Livermore Site for treatment or disposal at offsite locations (LLNL 2001ao).

A.3.2.21 *Building 851*

The Hydrodynamics Test Facility, Building 851, is part of the explosive test facility operations. This 13,681-gross-square-foot complex is in the northwest quadrant of the site and houses a LINAC, a laser room, several laboratories, a portable x-ray room, several shop areas, and offices (LLNL 2001ao).

Building 851 includes an open-air firing table of gravel-covered pads with stands of concrete, wood, or steel. During an experiment, an explosive device is placed on the test stand and fired. The firing debris may consist of wood, plastic, wiring, and gravel. The debris is potentially contaminated with unexpended explosives, beryllium, and depleted uranium (LLNL 2001ao).

Building 851 is equipped for the radiography of explosives devices during intentional detonation testing, including high-speed rotating-mirror cameras; optical interferometry for precise, free-surface velocity measurements; electronic pin timing diagnostics; and various other photoprocessing operations that involve both manual and automatic film and paper developing (LLNL 2001ao).

Hazards Assessment

The common hazards associated with the firing facilities are handling and firing explosives, high voltages, toxic and radioactive materials, high levels of ionizing radiation, firing malfunctions and misfires, grass fires, lasers, cranes and machine tools, and high pressure systems (LLNL 2001ao).

The hazards associated with the photoprocessing operations are laboratory reagents, photochemicals, and chemicals in spent developers, fixers, and rinsewaters. When film is processed, the developers and fixers are automatically replenished; and the generated waste is captured in separate barrels (LLNL 2001ao).

The hazard associated with the high-speed photographic equipment is use of high-speed rotors. Some camera rotors are made of beryllium; if these rotors are allowed to revolve at too high a speed, they will come apart, causing damage and scattering parts of the beryllium rotor around the camera room (LLNL 2001ao).

Formal operational safety plans have been prepared for the facility as a whole; these are supplemented for the unique requirements of individual tests and reviewed by the Hazards Control Department. All explosives are handled, transported, and test fired strictly following these procedures. All work with radioactive materials and with toxic materials conforms to established health and safety guidelines. Additional restrictions are imposed during the grass fire season (LLNL 2001ao).

Personnel safety is enhanced by positive key control of the various phases and aspects of the operation, including the enabling of the firing console. Personnel are excluded from areas of x-ray flux by fences, barriers, and interlocked access doors and gates. The interferometer room is also interlocked. Equipment is electrically isolated from the shot assembly until personnel are under cover. A muster is used for positive control of personnel access to the test area (LLNL 2001ao).

Following a shot, personnel are not allowed to enter the firing table area until specific conditions are met, including waiting for a prespecified period of time in case of malfunction or misfire. Appropriate personal protective equipment is used to re-enter the firing table after experiments involving hazardous materials. Water may be used to put out fires on the table and minimize dust production. Finally, table gravel is changed if the beryllium and radioactivity levels are above the derived working limits: 500 micrograms per gram for beryllium, 5,000 picocuries per gram for alpha emitters, and 10,000 picocuries per gram for beta and gamma radiation (LLNL 2001ao).

Generated Wastes and Effluents

The firing table debris consists of gravel and fragments of wood, metal, and glass; larger debris consists of tent poles, wood, steel, aluminum, concrete, plastic, glass, burlap bags, cables, and other inert testing materials. These wastes may be contaminated with low levels of depleted uranium and thorium. Small amounts of lead, beryllium, copper, barium, and vanadium may also be present (LLNL 2001ao). In the past, tritium has been a contaminant at this facility and it will continue to be so in the future (LLNL 2003i).

The firing table debris is characterized to segregate the low-level radioactive waste from chemically hazardous waste. The former is placed in containers and transported to the Building 804 waste staging area. All hazardous wastes (nonexplosive-contaminated) are transported to Building 883 for storage prior to shipment to Livermore Site for treatment or to offsite disposal facilities (LLNL 2001ao).

The photoprocessors automatically develop and fix film, and the waste generated is captured in separate barrels. This hazardous waste is taken from the barrels to the containers at the satellite accumulation area outside of the building. These containers are inspected weekly and properly labeled. These wastes in containers are temporarily stored in this area and transferred by RHWM to the Livermore Site for treatment and/or disposal at offsite facilities (LLNL 2001ao).

A.3.2.22 *Building 854 Complex*

The Dynamic Test Complex, Building 854, is in the southwest quadrant of Site 300. This 11,216-square-foot complex consists of 10 buildings, 854A through 854H, 854J, and 854V, originally designed for the vibration and physical shock testing of assemblies containing hazardous materials at various temperatures. During its operating life, a variety of materials were tested in this complex, including explosives, natural uranium, depleted uranium, thorium, beryllium in metallic form, and fissile and other radioactive materials (LLNL 2002j).

Buildings in the complex, with the exceptions of Buildings 854A, H, and V, are inactive or used as industrial storage while awaiting demolition. Current operations at these facilities (Buildings 854B-G, J) consist of monitoring and surveillance activities (LLNL 2002j). Building 854A, H, and V (2,458 square feet, 3,184 square feet, and 500 square feet, respectively) currently are used as part of the Site 300 Response Training Facility. LLNL conducts emergency response exercises at Site 300, which simulate field-implemented weapon disarmament. Explosives training devices are assembled in Building 854H. Any intentional explosives detonation activities will be performed at explosives test facilities by qualified personnel. Non-LLNL personnel performing

explosives work will be observed by qualified LLNL personnel who are familiar with Site 300 safety controls and procedures.

Hazards Assessment

General industrial hazardous operations in this facility are associated with decommissioning powered equipment and include solvents, oils, regulated metals, and compressed gases (LLNL 2002j). Building 854H hazards include exposure to explosive assemblies. The exercises use a number of Site 300 facilities in their current configuration. Minor modifications involving the construction of fences within and around Building 854H would be required for training activities (DOE 2002n).

Generated Wastes and Effluents

Hazardous waste and nonhazardous waste produced during decommissioning of the machine shop include spent halogenated and nonhalogenated solvent solutions (both organic and inorganic), petroleum and mineral-based oils, empty containers, metal filings, and contaminated equipment (LLNL 2002j). No wastes are associated with the explosives training facility.

A.3.2.23 *Building 857*

The Materials Management Storage Facility, Building 857, is in the southwest quadrant of Site 300. This 440-gross-square-foot facility is used to store explosives and explosive assemblies that may contain depleted uranium, thorium, and mock explosives (LLNL 2000u).

Hazards Assessment

The explosives are properly packaged and monitored by periodic inspections. There is no compatibility problem in this facility because the explosives and detonators are not stored together, and only explosives of the same storage group are allowed to be stored together (LLNL 2000u).

Safety features in this building include alarms and warning signs. The cell doors are secured by combination locks and have alarms. Access to the cells is limited to authorized personnel (LLNL 2000u).

Generated Wastes and Effluents

This facility is used for the long-term storage of explosives and explosives assemblies, and there are no operational-generated wastes or effluents. Occasionally, maintenance and support activities generate waste.

A.3.2.24 *Building 883*

The RHWM Container Storage Facility, Building 883, is located in the southeast quadrant of Site 300. This building consists of two sections. The southern section of the building is a RCRA-permitted facility, which consists of a fenced, covered area measuring approximately 1,733 square feet and surrounded by a concrete berm. Building 883 is used to store nonexplosive,

nonradioactive hazardous wastes from generator facilities within Site 300. The northern section of Building 883 houses a waste accumulation area. The waste accumulation area is used to accumulate waste for up to 90 days for characterization and/or repackaging. In addition to the waste allowed in the permitted facility, the waste accumulation area will accept some radiological materials, radioactive and mixed waste, improperly packaged waste or waste in damaged containers, and improperly characterized waste. Generators identify and package waste and then transfer it to Building 883 where it is stored prior to shipment to the Livermore Site or offsite for disposal (LLNL 2001av).

Hazards Assessment

The hazards at this facility involve personnel exposures to hazardous materials including aqueous wastes, flammable liquids, acids, caustics, oxidizers, flammable solids, other toxic materials, and PCB-contaminated materials. There are no radioactive wastes stored in the RCRA-permitted southern section of this facility (LLNL 2001aj).

Generated Wastes and Effluents

This facility stores wastes generated at Site 300 facilities. Typical stored wastes include acids (liquids), asbestos, combustible liquids, compressed gases, flammable liquids, halogenated and nonhalogenated solvents, lab packs, laboratory debris (solids), mercury and mercury-contaminated waste, miscellaneous chemical waste and contaminated debris, mixed waste (liquid/solid waste containing both hazardous and radioactive constituents), oils (liquid/solid), PCBs (liquid/solid), paints (liquid/solid), photochemicals, liquid poisons, radioactive waste (liquid/solid), reactive materials, and wastewaters (LLNL 2001av).

A.3.2.25 *Explosives Storage Magazines*

All explosives at Site 300 are stored in vaults or bunkers called magazines or magazettes. There are about 60 magazines located throughout the site, with floor areas typically ranging from 50 to 500 square feet.

A magazine is defined as an approved structure specifically designed for the storage of explosives, excluding operating buildings. A storage magazine is used for the long-term storage of bulk explosives and assemblies. A service or ready magazine is used for short-term (maximum of 180 days) storage of explosives and assemblies currently being used in an operation. A magazette is a small magazine (not large enough for an entry) used to store explosives that require separate storage (LLNL 2000u).

In addition to these storage magazines, a laboratory or building may contain a storage vault, which is typically a locked room or cabinet, for short-term storage of explosives that are currently being used in the operations (LLNL 2000u).

Hazards Assessment

Proper packaging, explosives deterioration, and chemical compatibility are the major areas of safety concern. Packaging is monitored by periodic inspection of the magazines. Compatibility problems are controlled by assignment of explosives into storage compatibility groups and the

storage review program is designed to control the use of explosives that have deteriorated (LLNL 2000u).

Each magazine has an associated weight limit, and the weight limit signs are posted near the entrance to the magazine. An inventory record is kept for each magazine and reflects the actual weight stored in the magazine. Storage magazines are inventoried once every 6 months and service magazines are inventoried every 3 months to verify that the weight of their contents is equal to or less than the posted weight limits (LLNL 2000u).

The safety and operational controls are described below (LLNL 2000u).

- Explosive assembly components are the only materials stored in the magazines.
- Propellants containing nitrocellulose vary widely with respect to stability, and the decomposition of some may lead to incidents of spontaneous ignition. There is a special surveillance system program for these propellants. One sample from each lot or batch is designated as a control item and is inspected annually. Deteriorated propellants are sent to disposal.
- Explosives devices such as actuators, detonators, squibs, and ammunition are never retained beyond the manufacturer's recommended shelf life.
- No smoking is permitted in the magazine area out to a distance of 50 feet.
- Most magazines are vented. Some magazines may require air conditioning or special ventilation systems to reduce deterioration of explosives due to hot, stagnant conditions. For safety reasons air conditioning is also used in some instances to prevent overheating.
- Empty explosives containers must be marked as empty, but may not be removed from the magazines. Packaging materials such as wood and paper are handled as explosives-contaminated waste and are removed from the magazine.
- The magazine areas are equipped with emergency telephones. There are posted personnel limits for each magazine area and only qualified personnel are allowed.

Generated Wastes and Effluents

The magazines are used for storage of explosives and explosive assemblies; no explosive wastes are generated in them. Only small quantities of packaging materials are handled as explosives-contaminated wastes.

A.3.2.26 *High Explosives Rinsewater Surface Impoundment Ponds*

Two connected surface water impoundments are in the southeast quadrant of Site 300. These impoundments were constructed in response to a Central Valley Regional Water Quality Control prohibition against discharge of nonhazardous rinsewaters to the ground surface or to unlined basins (LLNL 2002ap). Wastewater generated in Buildings 806, 807, 809, 817, and 829 passes through filter bags, a conical clarifier, a settling basin, and a weir before entering the surface

impoundments (LLNL 2000z). The impoundment ponds are comprised of an upper and lower pond that together comprise approximately 42,000 square feet. The basins are lined with 2 feet of clay and a 60-mil thick, high-density polyethylene synthetic liner (LLNL 2002ap). A leachate collection and removal system, installed between the high-density polyethylene liner and the clay liners, allows the system to be monitored for leaks (LLNL 2002cr). Process and photo rinsewater from the process area, chemistry area, and B-Division firing areas are also discharged into the surface impoundments (LLNL 2002ap).

Hazards Assessment

The major hazards associated with the impoundments are slips and falls and natural hazards such as rattlesnakes, scorpions, spiders, etc. (LLNL 2002ap).

Generated Wastes and Effluents

Typically, no waste is generated at the surface impoundments. However, the liners are nearing the end of their predicted life span and will be replaced, probably during calendar year 2004. Replacing the liners will result in removal of the sludge, recently characterized as nonhazardous, as well as the old liners (LLNL 2002ap).

A.3.2.27 *Security, Medical, and Emergency Response Facilities and Services*

The security, medical, and emergency response facilities are in the southeast quadrant of Site 300. Building 882 (4,912 gross square feet) houses the Protective Services Division communication center. Building 889 (2,709 gross square feet) houses the badge office and the medical center, which provides services including physicals, blood tests, and record keeping. Building 890 (6,752 gross square feet) houses the Site 300 Fire Department, which not only provides services to the 11-square-mile test site, but also responds to emergencies along Corral Hollow Road and surrounding regions under mutual aid agreements. The Fire Station also provides decontamination facilities that are shared with Building 889 (DOE/UC 2000).

Biomedical wastes generated from the medical facility include needles, syringes, gauze, gloves, and other materials that could be contaminated with infectious agents. These wastes are transported to BBRP at Building 361 for autoclaving. Spent alcohols are also generated. All wastes are handled by RHWM for proper disposal. The LLNL emergency response capabilities for the Livermore Site and Site 300 are described in Appendix I.

A.3.3 No Action Alternative, Site 300

This section describes the projects and programs under the No Action Alternative for Site 300. Projects required to maintain the existing infrastructure, such as building maintenance, minor modification to buildings, general landscaping, road maintenance, and similar support activities, are part of the No Action Alternative and are described here. Operational modifications to existing projects, projects involving new facilities or maintenance, and major deactivation and D&D projects are summarized in Table A.3.3–1. Figure A.3.3–1 shows the locations of these projects. A list of all D&D projects at Site 300 is provided in Table A.3.3–2.

TABLE A.3.3–1.—*Site 300 Program Projections*

Project Name	Square Feet	Map Location
No Action Alternative		
Site 300 Revitalization Project	N/A	N1
Site 300 Wetlands Enhancement	N/A	N2
Site 300 Tritium Use	N/A	a
Site 300 as a Response Training Facility	N/A	N3
Site Utilities Upgrade (SURUP)	N/A	a
Remove and Replace Offices	20,000/year	a
Deactivation, Decommissioning, Demolition	20,202	b
Proposed Action would include the following projects in addition to the No Action Alternative projects		
High Explosives Development Center	23,000	P1
Energetic Materials Processing Center	40,000	P2
Deactivation, Decommissioning, Demolition	109,333	b
Reduced Operation Alternative would affect the following project		
Reduce number of hydroshots at Site 300	N/A	a

Source: Original.
a several site-wide locations.
b See Table A.3.3–2 for Site 300 Deactivation, Decommissioning, and Demolition projects.

TABLE A.3.3–2.—*Site 300 Deactivation, Decommissioning, and Demolition Projects*

Facility Number	Facility Name	Square Feet	Waste Generation (LLW, MLLW, transuranic, solid sanitary waste, etc.) (tons)
No Action Alternative			
808	Vacant	1,484	0.742
814	Vacant	2,122	1.061
820	Vacant	2,208	1.104
838	Vacant	601	0.3005
840A	Vacant	388	0.194
840B	Vacant	389	0.1945
854B	Dynamic test facility	331	0.1655
854C	Dynamic test facility	1,623	0.8115
854D	Dynamic test facility	331	0.1655
854E	Dynamic test facility	905	0.4525
854F	Dynamic test facility	826	0.413
854G	Dynamic test facility	1,278	0.639
854J	Dynamic test facility	5,316	NA
865C	Advanced Test	2,400	1.2
Proposed Action Includes all the projects under the No Action Alternative and the following additional projects			
OSM23	Magazine - storage vault	3,970	NA
OSM24	Magazine - storage vault	560	NA
805	HE assembly/machining	6,802	3.401
806A	HE machining	3,408	1.704
806B	HE machining	4,074	2.037
806C	HE machining	640	0.32
806D	HE machining	192	0.096
807	HE machining	1,575	0.7875
812A	Explosives test	2,283	1.1415
812D	Explosives test	241	0.1205
812E	Explosives test	1,295	0.6475
813	Change house	2,810	NA
817A	HE pressing	459	0.2295
817B	HE pressing	639	0.3195
817C	HE Storage	185	0.0925
817E	Vacant	183	0.0915
817F	HE pressing	565	0.2825
817G	HE pressing	217	0.1085
817H	HE pressing	859	0.4295
821	Chemistry storage	454	NA
823A	LINAC radiography	1,020	0.51
823B	LINAC radiography	1,728	0.864
825	Chem process	1,323	NA
826	Chem process	1,668	NA

TABLE A.3.3–2.—*Site 300 Deactivation, Decommissioning, and Demolition Projects (continued)*

Facility Number	Facility Name	Square Feet	Waste Generation (LLW, MLLW, transuranic, solid sanitary waste, etc.) (tons)
828A	Inactive	212	NA
828B	Inactive	199	NA
828C	Inactive	258	NA
832F	Storage	2,995	1.4975
854A	Response training	2,458	1.229
855A	Disassembly facility	685	0.3425
855B	Disassembly facility	637	0.3185
855C	Disassembly facility	612	0.306
856	Industrial storage	1,484	0.742
858	Drop tower complex	1,460	0.73
858A	Storage	865	0.4325
865	Advanced test	60,318	30.159

Source: LLNL 2003cj.
HE = high explosive; LINAC = LLNL Electron-Positron Accelerator; LLW = low-level waste; MLLW = mixed low-level waste; NA = Not available. Data will be in separate NEPA documentation for the facility.

A.3.3.1 *Site 300 Revitalization Project*

Site 300's infrastructure was revitalized in the 1990s. The project was essential to provide the needed infrastructure to support LLNL programs such as stockpile stewardship. The Site 300 revitalization project included improvements to the main entrance and the heavily traveled roads going up to the firing areas and construction of the automated central control post. The revitalization project also included upgrades to the flash x-ray radiographic machine, the many beam velocimeter, and other related hydrotest diagnostics.

The final phase of the Site 300 revitalization project involves improvements to the water system by establishing a connection and line extension to the San Francisco Hetch Hetchy aqueduct. Onsite water pipelines have been extended and upgraded and are currently waiting for the distribution of water to begin (LLNL 2000a).

A.3.3.2 *Site 300 Wetlands Enhancement Project*

Continued operations at Site 300 would remove up to 0.62 acre of wetland habitat. LLNL would mitigate the 0.62-acre artificial wetland removal by protecting and enhancing selected areas and increasing breeding opportunities for the California red-legged frog and California tiger salamander. A minimum of 1.86 acres; i.e., a 3:1 replacement ratio, of wetland habitat would be enhanced and managed for these two species. Two mitigation sites for enhancement would include the wetlands at Mid Elk Ravine near the Building 812 complex and the seep at the Super High Altitude Research Project (SHARP) Facility, Building 865. A third site, the Oasis, is designated for set-aside and monitoring.

A.3.3.3 *Site 300 as a Response Training Facility*

LLNL would conduct emergency response exercises at Site 300 that would simulate field-implemented weapon disarmament. Explosives training devices would be assembled in Building 854H. Setup and firing of explosives systems would be done by qualified DoD explosive ordinance disposal personnel under the observation of a limited number of LLNL personnel who are familiar with Site 300 safety controls and procedures. The exercises would use a number of Site 300 facilities in their current configuration. Minor modifications involving the construction of fences within and around Building 854H have occurred (DOE 2002n).

A.3.3.4 *Site 300 Tritium Use*

Each facility could have 20 milligrams of tritium resulting in a credible release scenario of this amount. The need to perform several intentional detonation experiments with a few micrograms of tritium and a small number of experiments with a few milligrams of tritium is anticipated and serves as the basis for the annual emissions value of 20 milligrams. This annual emissions value is considered a maximum amount. The actual emissions may vary widely depending on the specific experiments needed to support the programmatic mission.

In addition, as part of the No Action Alternative, LLNL would suspend the performance of all tritium experiments at Buildings 812 and 850. Because experiments that do not contain tritium would likely contain other radioisotopes, no reduction in the level of other low-level radioactive waste generated is anticipated.

A.3.3.5 *Site Utilities Upgrade*

Significant replacements and life extension improvements (over and above normal repair by replacement) would be required for LLNL's utility systems at Site 300. The scope of the project would include various upgrades to mechanical utilities including upgrades to the Site 300 heating and cooling systems, potable water system, and a transmission line looping system at Site 300. Asbestos-containing building materials would also be addressed by the implementation of an asbestos management program which would include surveying buildings and structures, removing damaged asbestos-containing building materials discovered during the surveys, and as-needed asbestos abatement (LLNL 2003cj).

A.3.3.6 *Remove and Replace Offices*

This project would consist of the removal, relocation, and replacement of temporary facilities. These facilities consist of trailers and modular units that house temporary offices. The facilities would be replaced by modular or permanent structures in previously developed areas and would include site preparation and construction of new parking areas or improvement to existing parking areas.

Land disturbance associated with the demolition and new construction would be minimal. Sites would be evaluated for archaeological and biological impacts prior to, and in the case of, potential archaeological impacts during new construction activities. Debris from the demolition

and construction process would be handled and disposed of (or recycled, if appropriate) in accordance with established LLNL procedures.

A.3.3.7 *Deactivation, Decommissioning, and Demolition Projects*

This project would D&D 14 excess facilities at Site 300, encompassing 20,200 gross square feet. Facility deactivation could include disposition of stored or surplus materials that may be potentially contaminated. These materials and equipment are designated as legacy items, meaning there is no identified sponsor or program. Most legacy materials are materials that were placed in storage or set aside for a future need that never materialized.

Deactivation support activities could include material abatement, characterization, spot decontamination, material containment, spill cleanup, waste packaging, and disposal. Buildings that are obsolete and too expensive to rehabilitate would undergo demolition. The demolition effort would include electrical and mechanical isolation from the LLNL utility grid; sampling for contamination, characterization, and proper disposal of all subsystems and components; and dismantling and disposal of the structures. Where feasible, building materials that could be recovered would be segregated and transported offsite for recycling.

The list of excess facilities, including gross square footage and estimated waste generation, is provided in Table A.3.3–2.

A.3.4 Proposed Action, Site 300

The Proposed Action at Site 300 would include the projects and programs described under the No Action Alternative (Section A.3.3) and the additional projects and programs described in this section. Planned projects and programs are listed in Table A.3.3–1. Figure A.3.3–1 shows the locations of these projects.

A.3.4.1 *High Explosives Development Center*

The High Explosives Development Center (HEDC) Project would construct approximately 23,000 square feet of new buildings and renovate the existing Building 827 complex located in the south-central section of Site 300. This project would consolidate operations currently conducted in Buildings 825 and 826 and the Building 827 complex. The HEDC will modernize and replace chemistry and materials science facilities built in the 1950's and 1960's at Site 300. These facilities must be rehabilitated or replaced to keep pace with the future work envisioned for mission-critical activities of the supporting facilities at Site 300 such as the Contained Firing Facility, the EMPC, and weapons life extension programs.

Operations and equipment would include mechanical pressing; vertical temperature-controlled mixers for mixing explosives binders, plasticizers, and other compounds; a 50-cubic-inch deaerator loader for processing the extrudable explosives; vacuum ovens for drying materials; mills for reducing particle sizes; a loader for processing extrudable explosives; blenders and kettles for preparing explosives; an environmental chamber and associated control and interlock modules; electrical resistance measurement devices; a gas sampling oven; and a computer system (LLNL 2003cj, LLNL 2002ap).

A.3.4.2 *Energetic Materials Processing Center Project*

Existing energetic materials processing facilities and equipment at Site 300 are becoming obsolete and inadequate to meet LLNL requirements. This project is intended to move the operations currently conducted in Buildings 805, 806, 807, 810A-C, 813, and 823A-B into a new modern facility. The Building 810A-C complex would be retained for some assembly operations currently conducted there and for waste package operations currently conducted in Building 805. All other facilities would be demolished (see Section A.3.4.3). The proposed Energetic Materials Processing Center (EMPC) would be located at the Site 300 process area in the vicinity of the Magazine 21-24 loop. The project would include the construction of a new 40,000-gross-square-foot processing facility and four magazines, two capable of storing 1,000 pounds of high explosives and two capable of storing 500 pounds of explosives. Typical explosives anticipated to be used in EMPC are the same as those currently in use at Site 300 and include HMX, PETN, RDX, TATB, and TNT. The EMPC is required to provide ongoing energetic materials processing capabilities which, when combined with increased computational capabilities, will add greatly to the understanding of weapons physics resulting in increased confidence in certification of the stockpile. The EMPC would house explosives machining, pressing, assembly, inspection, and radiography. Additionally, the facility would provide a machine shop, offices, storage, showers/change room facilities, equipment rooms, and miscellaneous support spaces (LLNL 2002ap).

Because the EMPC would replace certain functions in Buildings 805, 806, 810A-C, 813, and 823A-B, impacts from EMPC operations would be similar to those from existing operations in those buildings. For example, the facilities that EMPC would replace have approximately 7 employees. The EMPC would have 7 to 10 employees. Process water consumption would consist primarily of water sprayed on explosives during machining and washdowns, which would be similar to current usage in the process area facilities. Electric power consumption could decrease slightly from current levels as a result of energy conservation measures that would be designed into the new facility. Impacts to other environmental resource areas as a result of EMPC operations would remain unchanged. The facility design and operation would include careful attention to Federal, state, and local environmental laws and regulations.

Construction of the EMPC would occur over a period of approximately 2 years and would employ approximately 75 workers during peak construction periods. Site improvements would include clearing and grading approximately 2.5 acres of grassland for the building, magazines, roadways, and parking area. Existing utilities would be extended approximately 2,500 feet to the new building. The extension of utilities would involve minor trenching. Construction debris and any excess soils would be analyzed and disposed of in accordance with Federal, state, and local regulations, applicable DOE Orders, and LLNL procedures.

Construction activities would result in short-term impacts to air quality in the form of fugitive dust and emissions from construction equipment and motor vehicles. General construction practices at Site 300, including contract specifications, would require that fugitive emissions be reduced by means such as water spraying of roads and the wheels and lower portions of construction vehicles and covering exposed piles of excavated material. Thus, application of periodic water spray would mitigate, to the extent feasible, the potential impact of fugitive dust generated during the EMPC construction on ambient air quality at Site 300.

Noise levels to both onsite and offsite populations would not be increased by the construction activities. Workers involved with the EMPC construction would wear appropriate hearing protection when necessary.

The proposed EMPC construction site would not be located within or near any identified wetlands area or 100-year floodplain. Best management practices appropriate for site conditions would be followed during construction to prevent the transport of disturbed soils or construction materials from the construction site.

Preconstruction surveys for threatened and endangered species would be conducted within 60 days prior to ground-disturbing activities. Depending upon the results of the survey, mitigation measures such as the establishment of exclusion zones, would be implemented to protect any observed species.

No known cultural resources are located within the proposed construction area. Any subsurface cultural resources that could be unearthed during construction activities would be reported to the LLNL archaeologist. Construction activities within the vicinity of the find would be halted until the find is assessed and any necessary mitigation measures are developed in consultation with DOE, the State Historic Preservation Office, and the Advisory Council on Historic Preservation.

Normal construction hazards would be present during the construction phase for the proposed action. Workers would receive proper safety training prior to construction, and all activities would be in accordance with all relevant *Occupational Safety and Health Act* requirements. The results from the preconstruction sampling would determine if worker protection measures would be required. These would consist of approved LLNL procedures that govern work in areas of known contamination to minimize worker exposure and prevent the tier spread of contamination from excavation activities.

A.3.4.3 *Deactivation, Decommissioning, and Demolition Projects*

This project would D&D 50 excess facilities at Site 300, encompassing 129,535 gross square feet of floorspace, including 20,200 square feet under the No Action Alternative. Facility deactivation could include disposition of stored or surplus materials that may be potentially contaminated. These materials and equipment are designated as legacy items, meaning there is no identified sponsor or program. Most legacy materials are materials that were placed in storage or set aside for a future need that never materialized.

Deactivation support activities could include material abatement, characterization, spot decontamination, material containment, spill cleanup, waste packaging, and disposal. Buildings that are obsolete and too expensive to rehabilitate would undergo demolition. The demolition effort would include electrical and mechanical isolation from the LLNL utility grid; sampling for contamination, characterization, and proper disposal of all subsystems and components; and dismantling and disposal of the structures. Where feasible, building materials that could be recovered would be segregated and transported offsite for recycling.

The list of excess facilities, including gross square footage and estimated waste generation, is provided in Table A.3.3–2.

A.3.5 Reduced Operation Alternative, Site 300

The following project would be curtailed under the Reduced Operation Alternative. This would be a change to the baseline operations described under the No Action Alternative. The project is summarized in Table A.3.3–1.

A.3.5.1 *Reduce Number of Hydroshots at Site 300*

Under the Reduced Operation Alternative, NNSA proposes to perform fewer intentional detonation experiments at Site 300 firing tables or the Building 801 Contained Firing Facility, resulting in a reduction of both hazardous and radioactive materials including tritium. This would result in a reduction in the maximum annual tritium emissions from 200 curies to 150 curies. Other types of experiments such as environmental testing of explosives assemblies would continue unchanged in the number of experiments and amounts of tritium. The programmatic impacts of this alternative could include having less confidence in the evaluation of two types of component functions within weapon systems.

A.4 RADIOACTIVE MATERIALS AND CHEMICAL INVENTORIES—LIVERMORE SITE AND SITE 300

Radioactive and chemical inventory data for the Livermore Site and Site 300 are listed in Table A.4–1 through Table A.4–6. Emission rates are listed in Tables A.4–7 and A.4–8.

Waste and inventory data include:

- Radioactive materials inventories for the selected facilities (Tables A.4–1 and A.4–2)
- Chemical inventories for the selected facilities (Tables A.4–3 and A.4–4)
- Estimated emission rates, based on 2001 fuel use (Tables A.4–5 and A.4–6)
- High explosives, maximum quantities – 100,000, annual facility average quantities – 15,000 pounds, facility locations LLNL-wide.

The inventory data listed in Tables A.4–1 through A.4–6 represent only the selected facilities described in this appendix. The tables show typical quantities rather than maximum limits. These chemicals and radioactive materials are subject to change as LLNL experimental requirements change. Additionally, the chemical inventory data presented in this appendix for both sites were reduced from an extensive list and were limited to extremely hazardous chemical quantities greater than 1 pound and all other chemical quantities greater than 500 pounds present in these selected buildings. Therefore, some chemicals listed in the building descriptions may be used in smaller quantities and may not appear in the tables. Figures A.4–1 and A.4–2 show waste management facilities at the Livermore Site and Site 300, respectively.